The Trade Balance Effects of Foreign Direct Investment in U.S. Manufacturing

by James Orr

Rising foreign direct investment in U.S. manufacturing during the 1980s has increased the number and importance of U.S. affiliates of foreign firms. In particular, the large investment inflows of the latter half of the decade have made these affiliates potentially important sources of improved industry competitiveness. Over the long term, the presence of foreign-owned firms may strengthen the international trade position of U.S. manufacturing. Significant shares of the assets of several industries heavily involved in international trade are now under foreign control. Moreover, countries that are major international competitors of the United States, notably Japan, have made large investments in a number of these industries. In fact, some observers contend that the highly competitive U.S. affiliates of Japanese multinationals will substantially reduce the large U.S.-Japan bilateral trade deficit by the mid-1990s.

This article examines the extent to which the growth in overall foreign ownership of U.S. manufacturing firms is likely to improve the U.S. trade balance over the longer term. Foreign ownership may be expected to improve the trade balance for several reasons. Production in U.S. affiliates of foreign multinational corporations could potentially displace imports from either foreign parent companies or other foreign suppliers. More important, the "supply-side" effects of foreign direct investment (FDI), including the transfer of technological or other competitive advantages from foreign parents to their U.S. affiliates, could expand U.S. exports. As with most investments, these improvements in productivity and international competitiveness would only be observed over time.

The impact of the recent increase in FDI on the U.S. trade balance is analyzed in two steps. First, a standard trade model is used to estimate the broad economywide effect of FDI. Second, four manufacturing industries that are important for U.S. trade performance and that have had sizable inflows of foreign capital—automobiles, steel, electronics, and chemicals—are individually examined to obtain a more detailed picture of FDI's influence across sectors. Evidence from these case studies is combined with the estimates from the standard trade model to derive an estimate of the long-run effect of FDI on the trade balance.

The evidence from this two-step analysis suggests that the growth in foreign ownership of U.S. firms will improve the U.S. trade balance in the longer term. More specifically, the eventual trade balance improvement attributable to the rapid increase in foreign investment in the second half of the 1980s is estimated to be on the order of $25 billion. Exports will be permanently higher by about $15 billion annually, while imports will be about $10 billion lower. The full impact of the FDI flows on U.S. trade, however, will not be fully realized for several years. This lag reflects the relatively long time required for competitiveness improvements arising from FDI to be observed in trade flows.

The first section of the article outlines the growth of foreign ownership of the U.S. manufacturing sector in general and the traded goods industries in particular. The section also highlights the characteristics of the recent FDI flows that are most likely to determine the longer term impact of foreign investment on the U.S. trade balance. The next section presents the trade model estimates of the effects of FDI on aggregate U.S. exports and imports. The analysis is then supple-

mented with an examination of the effects of FDI on trade performance in four individual manufacturing industries. The concluding sections of the article summarize the findings and assess the potential for longer term trade balance improvement.

Overview of foreign direct investment and its likely impact on the U.S. trade balance

The stock of FDI in the United States grew at a particularly rapid pace during the latter half of the 1980s Between 1985 and 1989, FDI flows averaged just over $50 billion annually, and roughly half of that investment went into manufacturing industries (Chart 1).[1] In 1990 FDI slowed but was still estimated to have increased by $25 billion. The 1990 book value of the total stock of FDI reached $426 5 billion; $173 5 billion, or roughly 40
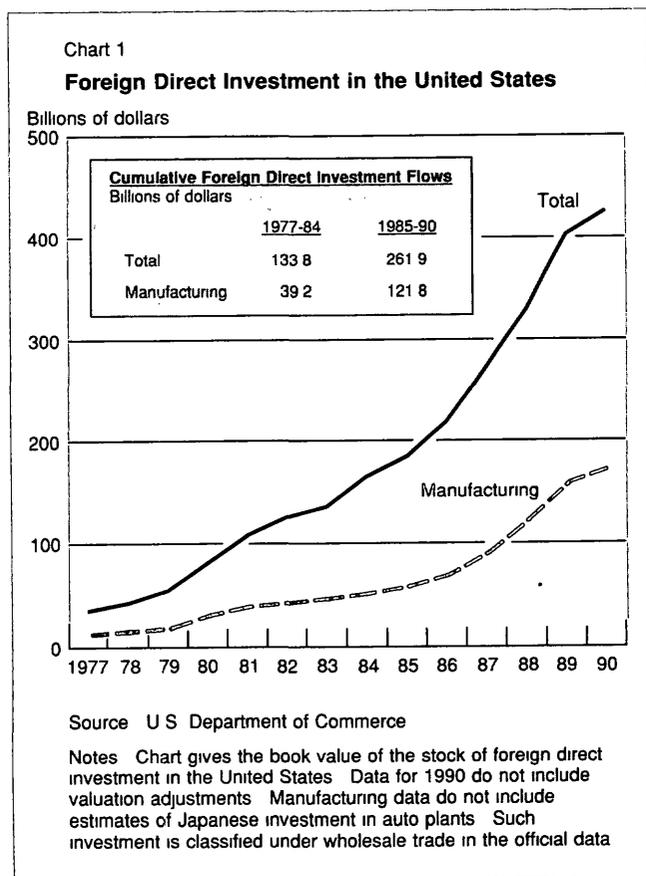
percent, of that amount was in manufacturing.[2]

Several features of this rapid growth in foreign control of U.S. manufacturing assets during the latter half of the 1980s suggest the specific channels by which FDI is likely to influence the trade balance First, with the exception of Japanese investors who established new automobile assembly plants in this country, foreign investors generally entered the U.S market by acquiring existing U.S firms rather than by setting up new firms On average, more than 93 percent of annual foreign investment outlays in manufacturing during this period were for acquisitions [3] Because transferring ownership of existing facilities does not add directly to an industry's productive capacity, FDI through acquisitions is not likely to lead to an immediate and significant displacement of imports or an expansion of exports

Committing substantial financial resources to acquire existing production facilities, however, does imply that foreign owners expect to improve the profitability of acquired U S. firms Indeed, the large FDI flows during the latter half of the 1980s were an increasingly important source of U S. investment, especially in the manufacturing sector, where they accounted for over 15 percent of annual plant and equipment spending (Chart 2)[4] Furthermore, the share of new capital spending by foreign-owned firms in overall new capital spending in manufacturing during the 1980s rose faster than the

Chart 1

Foreign Direct Investment in the United States

Billions of dollars

Cumulative Foreign Direct Investment Flows Billions of dollars		
	1977-84	1985-90
Total	133 8	261 9
Manufacturing	39 2	121 8

Source U S Department of Commerce

Notes Chart gives the book value of the stock of foreign direct investment in the United States Data for 1990 do not include valuation adjustments Manufacturing data do not include estimates of Japanese investment in auto plants Such investment is classified under wholesale trade in the official data

[1]For a discussion of the issues surrounding the collection and reporting of FDI data and additional details on FDI flows into the United States, see James Orr, "Foreign Direct Investment in U S Manufacturing Effects on the Trade Balance," Federal Reserve Bank of New York, Working Paper no 9032, September 1990

[2]The analysis in this article uses book value estimates of FDI The Department of Commerce has recently revised its estimates of FDI in the United States to reflect current-period asset prices The current-cost estimate of the stock of FDI in 1990 was $465 9 billion, while the market value estimate of the stock of FDI in 1990 was $530 4 billion Because the new estimates are only available beginning in 1982 and are not broken down by either industry or source country, they are of limited use for this analysis Furthermore, the annual changes in FDI stock based on current-cost estimates follow a pattern similar to the book value measures, while annual changes based on market values fluctuate widely and are not consistent with either book values or current-cost measures

[3]The investment outlays cited here differ from FDI measures reported in the balance of payments accounts in two ways First, they refer to the total value of the investment rather than to the amount financed by the foreign parent Second, they comprise only expenditures to acquire existing firms or to establish new businesses The data exclude expenditures by U S affiliates to expand existing facilities Unofficial Department of Commerce tabulations of investment spending announcements by both new and existing foreign-owned firms, regardless of the source of financing, show a comparatively large share of outlays to establish new plants and expand existing plants See U S Department of Commerce, International Trade Administration, "Foreign Direct Investment in the United States, 1988 Transactions," October 1989, for a tabulation of announced investment activities of U S affiliates

[4]Spending for acquisitions is included in FDI but not in measures of investment spending in GNP accounting Therefore, the shares in Chart 2 should be interpreted as indicating that FDI has been an increasingly important resource for investment but not necessarily a source of new physical capital

share of sales by foreign-owned firms in overall sales in manufacturing Paralleling the increasing importance of foreign-owned firms in investment is the growth in their share of total manufacturing sales and assets to 11 percent and 14 percent, respectively, in 1988 (the latest year for which affiliate operating data are available) Over time, therefore, the Expansion and modernization of affiliate production capacity through investments and the transfer of foreign parents' competitive strengths should help to improve the performance of these affiliates

A second important feature governing the influence of FDI flows on the U.S trade balance is that investment occurred in nontraded goods industries as well as heavily traded goods industries. A total of $66 5 billion of foreign-controlled assets, or roughly 25 percent of all foreign-controlled manufacturing assets in 1988, were in three largely nontraded manufacturing industries. stone, clay, and glass, printing and publishing, and processed food products (Table 1). The expanded presence of foreign-owned firms in generally nontraded manufacturing industries implies only an indirect link

between FDI and current trade flows If foreign ownership in these industries results in competitiveness gains for U.S affiliates, however, certain segments of these currently nontraded industries could see an expansion of exports Still, FDI in these nontraded manufacturing industries is not likely to result in a sizable short-term trade balance improvement.

A third feature of FDI in manufacturing is that some major source countries of FDI are not among the principal U S. trading partners The two largest foreign investors in U.S manufacturing during the 1980s, for example, were the United Kingdom and the Netherlands (Table 2) Conversely, the largest U S trading partner, Canada, is not a major source of investment The growth of FDI, therefore, is not likely to be followed by any large-scale substitution of domestically produced goods for imports from the countries acquiring control of U.S. manufacturing assets Rather, any import displacement effects would probably be spread across a broader group of suppliers.
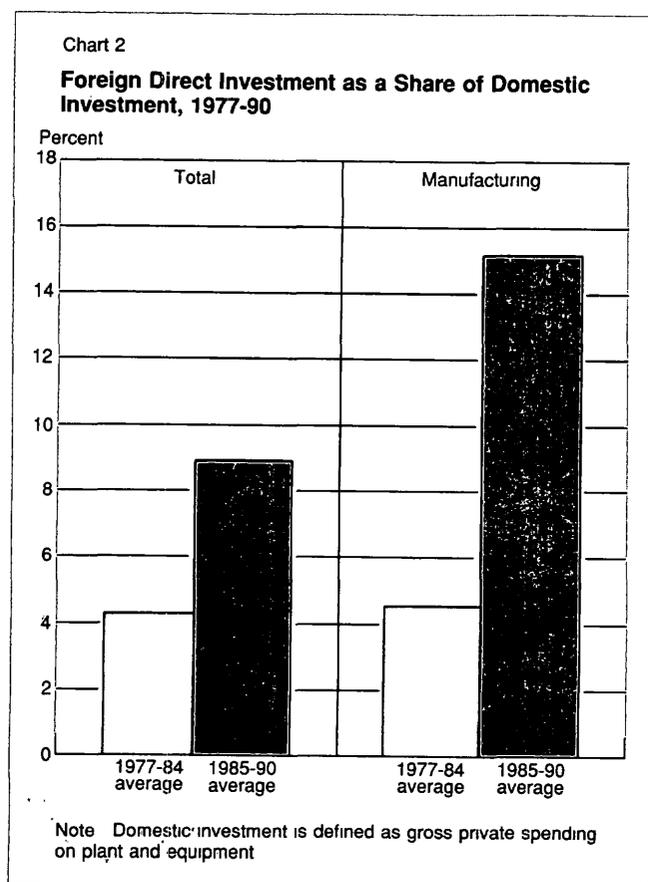
Among the major investors, only the Japanese depart from the patterns of foreign investment just described Most Japanese investments have been in traded goods industries characterized by relatively large U S -Japan bilateral imbalances. Japanese investors, despite their relatively small share of control of U S manufacturing assets, control significant shares of the assets of several traded goods industries, including steel, electrical and nonelectrical machinery, and transportation equipment Japan's investments suggest a significantly greater immediate link to U S trade balance adjustment than do the investments of other major FDI source countries

On the whole, however, the major features of the rapid growth of FDI in U S. manufacturing in the second half of the 1980s imply that significant export expansion or import displacement will likely occur over the medium-to-long term Because foreign investors have generally chosen to establish their presence in the U.S market through acquisitions of existing U S. firms, improved efficiency in the operation of these firms is likely to be the major source of improved international competitiveness Furthermore, the variety of sources of FDI and the presence of FDI in several nontraded industries suggest that eventual trade balance improvement could well involve a relatively broad group of foreign suppliers and currently nontraded products

Estimating the FDI-trade balance link
Analytical framework
FDI can improve the U S trade balance by enhancing the ability of U S firms to compete abroad and to meet import competition at home. Competitiveness gains resulting from foreign ownership stem from increased

Chart 2

Foreign Direct Investment as a Share of Domestic Investment, 1977-90

Note Domestic investment is defined as gross private spending on plant and equipment

productive capacity, greater operating efficiency, and the transfer of competitive advantages from foreign producers to U.S firms. These supply-side effects are over and above any direct effects on U.S competitiveness arising from exchange rate movements on prices.

It is only over time, however, that new investments result in higher productivity and improved international competitiveness In fact, in the initial period following a direct investment the trade balance typically worsens. Foreign-owned firms in the early stages of operation may look to the parent country as a source of capital

Table 1

Foreign-controlled Assets of U.S. Manufacturing Industries in 1980 and 1988

Industry	1988 Book Value of Assets under Foreign Control (Billions of Dollars)	Share of Industry Assets under Foreign Control (Percent)	
		1980	1988
All manufacturing	288 9	8 5	14 3
Stone, clay, and glass	21 1	13 4	41 1
Chemicals	80 9	18 4	29 3
Rubber and plastics	10 2	4 7	20 3
Steel and other primary metals	17 5	7 8	19 8
Fabricated metals	16 5	4 6	16 7
Electrical machinery	25 4	9 1	13 6
Printing and publishing	15 1	4 5	13 1
Food products	30 3	6 9	10 7
Machinery, nonelectrical	20 5	5 0	8 8
Paper	7 0	6 9	7 4
Textiles and apparel	4 1	4 7	6 8
Transportation equipment	17 3	4 4	5 9
Other industries	23 0	2 1	7 4

Sources U S Department of Commerce and Federal Trade Commission

Notes All manufacturing data exclude petroleum and coal products Data on the transportation equipment industry include an estimate of those assets of Japanese automobile producers that are classified under wholesale trade in the official data

Table 2

Country Sources of Growth in Foreign Direct Investment, 1986-89

Country	All Industries		Manufacturing Industries	
	Value (Billions of Dollars)	Share of Total (Percent)	Value (Billions of Dollars)	Share of Total (Percent)
United Kingdom	72 2	33 3	40 0	39 1
Japan	50 0	23 8	14 7	14 4
Netherlands	23 4	11 1	11 2	11 0
West Germany	13 4	6 4	9 3	9 1
France	9 7	4 6	8 2	8 0
Canada	9 6	4 6	7 5	7 3
Rest of world	31 7	15 1	11 3	11 1

Source U S Department of Commerce

equipment and supplies, thus increasing imports. The amount of actual production that takes place locally, known as "local content" or "local value added," may initially be relatively small. The trade balance improves over time to the extent that the foreign-owned firms switch to local suppliers of parts and components, manufacture products that displace imports, and begin to export their products. The dissemination of the technological or managerial advantages of the foreign-owned firm to domestically owned firms may also improve the competitiveness of the entire industry and result in further long-term improvements in the trade balance.

The changing impact of FDI on the trade balance over time complicates the analysis of its aggregate trade balance effect. Moreover, the timing of the process by which FDI affects trade can vary with the nature of the industry and the method by which the foreign firm entered the U.S. market. For example, the initial adverse effect of FDI on an industry's trade balance is likely to be less important, although not entirely absent, when FDI takes the form of acquiring existing firms.

The following analysis of FDI uses a statistical model of aggregate merchandise exports and imports to estimate the potential medium- to long-term effects of supply-side changes on the trade balance. The analysis then turns to case studies of four manufacturing industries—automobiles, steel, electronic equipment, and chemicals. The case studies clarify the timing and process by which FDI affects trade performance across sectors. They are also instrumental in gauging FDI's impact on U.S. imports because they capture some effects masked by import restrictions in the aggregate statistical model. For the automobile industry in particular, industry and firm data allow a quantification of both the initial increases in imports and the longer run effects on import displacement and export expansion.

Aggregate trade balance estimates

In conventional trade models, changes in aggregate merchandise export and import volumes are typically related to changes in exchange rates, relative prices, and economic growth rates. Here the conventional model is expanded to include a measure of the impact of growth in foreign ownership of the U.S. manufacturing capital stock on trade patterns.[5] (See box for the details of the estimation procedure.) The specific variable entered into the model is the share of the capital stock in the U.S. manufacturing sector that is foreign owned. This share averaged only 1.5 percent during the

[5]A discussion of trade models and the use of a measure of U S industries' relative productive capacity to explain trade patterns can be found in William Helkie and Peter Hooper, "An Empirical Analysis of the External Deficit, 1980-1986," in Ralph Bryant, Gerald Holtham, and Peter Hooper, eds , External Deficits and the Dollar (Washington, D C Brookings Institution, 1988)

1960s and 1970s but increased relatively rapidly during the 1980s. The growth in FDI since the mid-1980s increased the foreign-owned share of the manufacturing capital stock from about 4 percent in 1984 to more than 8 percent in 1990.

Effects on exports

Regression results show that U.S. exports expand in a statistically significant manner in response to increased foreign ownership of U.S. manufacturing firms. The response is estimated to occur on average two years after an initial investment. This effect is over and above the effects of exchange rates, relative prices, and foreign economic growth rates, factors that typically have a much more immediate impact on trade patterns. The deferred nature of the impact represents the time it takes for an increase in FDI to work through competitiveness channels to raise exports.

The model estimates suggest that the relatively large annual increases in FDI during the latter half of the 1980s are associated with an increase in the value of U.S. exports of roughly $20 billion over the longer term. That is, by 1992 the nominal value of U.S. exports will be roughly $20 billion higher than would otherwise have been expected because of the increased foreign ownership of U.S. manufacturing firms during this period. Increases in export volume account for over four-fifths of the projected increase in the nominal value of exports.

This potential $20 billion increase in exports arising from FDI would represent roughly a 5 percent increase over the 1990 level of merchandise exports. But the estimated longer term influence of the recent growth in FDI on exports might not perfectly measure the potential long-run expansion of exports for two reasons. First, limited past experience with FDI of this magnitude means there is little evidence on which to judge its effects on competitiveness. For example, exports might increase at a pace different from what the model predicts because the aggregate trade analysis does not measure the extent to which FDI will change the composition of exports. In particular, the model is not suited for estimating how extensively exports from traditionally nontraded goods industries are likely to grow. Second, the model does not use direct measures of productivity or other competitiveness gains associated with FDI but attributes the various changes in industry trade performance to the share of foreign ownership exclusively.

Effects on imports

The regression results indicate no significant reduction in imports arising from the growing foreign ownership of the U.S. manufacturing capital stock, even several years after the investment took place. In fact, the

results suggest that the initial increase in imports that is often observed following an increase in FDI is still not offset three years following the investment inflow.

A consideration of the industries that have been the largest recipients of FDI may explain this finding Two of the most heavily traded manufacturing sectors that have received significant investment from abroad, automobiles and steel, have been protected from import competition during much of the past decade Past experience with FDI, therefore, will not capture the potential for import reductions in these industries in the future For example, quotas effectively restrained imports of cars from Japan in the early and mid-1980s, and steel quotas bound several major suppliers in the mid-1980s, including Japan and the countries in the European Economic Community Further displacement of imports was unlikely to follow from increases of FDI in these industries Nevertheless, because import restraints are no longer binding in these two industries, future reductions in imports due to FDI could be significant

Trade balance effects of FDI in selected industries
The aggregate statistical analysis provides only limited insight into the likely long-term trade balance effects of

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Box: Estimating the Trade Balance Effects of Foreign Direct Investment

Conventional trade models relate U.S. export and import volumes to exchange rates, relative prices, and measures of economic activity. Extensions of conventional trade models include various measures of the U S capital stock to capture the influence of long-run supply-side changes in U.S. competitiveness on trade flows The trade model estimated in this article includes measures of both the overall U S capital stock and the foreign-owned share of the U S capital stock in the manufacturing sector to capture the influence of these separate sources of change in U S competitiveness on U.S trade flows. The estimated equation uses relatively long lags of the FDI measure to allow sufficient time for the effects of FDI on trade to be observed and to avoid capturing the short-run adverse effects on trade flows that often follow an increase in FDI

The model was estimated using annual data for the period 1967–89 The regression coefficients are presented in the table (t-statistics in parentheses)

The economic activity, relative price, and FDI variables were entered in the equation in logarithmic form, and hence their coefficients could be interpreted as elasticities The U S capital stock variable was entered as an index. The export equation was corrected for serial correlation.

Both the U S capital stock and FDI variables were estimated to have had statistically significant positive effects on exports, but neither had a statistically significant effect on imports The text estimate of a $20 billion potential future increase in exports due to FDI was computed by applying the estimated elasticity of real exports to FDI of 21 to the growth in the share of foreign ownership of the U.S. manufacturing capital stock during the latter half of the 1980s § This procedure yielded an estimated total increase in exports of roughly $18 billion. Nominal export values were then computed by assuming that export prices grew at 2 0 percent annually, the average annual growth rate of export prices between 1985 and 1990

Explanatory Variable	U.S. Exports	U.S. Imports
Intercept	−0 6 (−0 2)	−10 1 (−6 2)
Foreign economic activity†	1 2 (1 6)	—
U S domestic demand	—	2 4 (5 6)
U S /foreign prices‡	− 77	64
U S capital stock	06 (4 5)	03 (0 21)
FDI		
Two-year lag	21 (2 6)	33 (2 7)
Three-year lag	—	− 15 (−0 9)
Trend	−0 2 (−3 9)	—
Statistics		
R̄²	98	99
Durbin-Watson	1 7	2 3

†Trade-weighted average of domestic demand in the major six foreign economies

‡Figure is the sum of current and one-year lagged coefficients in the export equation, and current, one-, and two-year lagged coefficients in the import equation

§The actual calculation assumed that 21 was an arc elasticity rather than a point elasticity in order to apply it to the large percentage change in FDI

FDI in the latter half of the 1980s. The statistical analysis is hampered by the relatively brief time that has elapsed since these investments were undertaken and by import restraints in some key industries. Additional information about the process and timing of the effects of FDI on trade can be gained from case studies of four industries automobiles, steel, electronics, and chemicals These industries have had sizable shares of investment from the major FDI source countries and, with the exception of automobiles, all have had a relatively long experience with FDI. These industries account for one-half of all foreign-owned assets in the U S manufacturing sector In 1990, moreover, these industries accounted for over one-half of all U.S. non-oil imports and one-third of nonagricultural exports. Deficits with the major source countries in these industries equaled roughly one-half of the U.S. merchandise trade deficit (Table 3). Estimates of the effects of FDI on exports and imports in these industries, therefore, provide a basis for extrapolating the aggregate effects of FDI on the U.S. trade balance.

Automobiles

Japanese investments in the U.S. automobile industry provide perhaps the strongest potential link between FDI and U.S. trade.[6] Currently, all major Japanese automobile producers are operating passenger car assembly facilities, or "transplants," in the United States Data on unit sales of passenger cars show that Japanese automobile transplants have steadily increased their sales in the U S. market from roughly 50,000 in 1984 to 680,000 in 1989 and more than 1 million in 1990 (Chart 3) U.S trade restraints have been a prime factor behind the inflow of Japanese FDI. Increased production by Japanese transplants in the United States between 1983 and 1985 coincided with the binding restraints in effect on exports of Japanese cars[7] Since 1986, however, restraints on exports have not as a whole been binding, reflecting both dollar depreciation and, more recently, the slowdown in the overall U S auto market

The trade balance effects of the transplants can be studied in two stages. In the first stage, the key ques-

[6]Germany, the other major foreign investor in the U S automobile industry, has ceased all automobile production in the United States

[7]Between April 1981 and March 1984, annual exports of passenger cars from Japan were limited to 1 68 million units, and from April 1984 on, to 1 84 million units The limit was raised to 2 3 million in 1986 and remains at that level

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Table 3

U.S. Trade with Principal Foreign Investors in Selected Manufacturing Industries, 1990

Industry	Total 1990 Imports (Billions of Dollars)	Principal Investors	Imports from Principal Investors, 1990 (Billions of Dollars)	Industry Bilateral Trade Balance, 1990 (Billions of Dollars)
Automobiles	87 2	Japan	32 2	− 30 7
Steel and other primary metals	19 6	Japan	1 5	+ 1 2
		Canada	6 0	− 2 2
Chemicals	14 2	United Kingdom	1 1	− 0 1
		West Germany	1 9	− 0 9
		Canada	3 3	+ 1 1
Electronic equipment	72 5	United Kingdom	1 2	+ 3 4
		Canada	6 1	+ 4 0
		Japan	26 3	− 19 9
Total	193 5		79 6	− 43 0
Share of total non-oil imports, 1990 (percent)	44 6		18 3	
Share of merchandise trade deficit, 1990 (percent)				42 6

Source U S Department of Commerce

tion is the extent to which the transplants import capital equipment and supplies The share of automobile inputs produced by U.S suppliers, or the domestic sourcing of Japanese transplants, is currently about 50 percent, implying that half the parts and materials used in each automobile in a Japanese assembly plant in the United States are imported. This relatively high import content, coupled with the imports of capital equipment and supplies used to establish and outfit the plants, is estimated to have raised U.S imports by roughly $2 5 billion in 1989 Domestic sourcing in Japanese-owned automobile plants is, however, expected to increase to roughly 75 percent by 1993, achieving a level slightly below the projected 83 percent domestic sourcing of U S producers for the same year.

Estimating the longer run trade balance effects entails considering not only the extent of increased domestic sourcing, but also the degree to which cars produced by the transplants will displace imports and the value of transplant exports The displacement rate is defined as the reduction in the volume of imported cars associated with an increase in production by Japanese transplants An estimate of this displacement rate can be derived in the following way. Between 1983 and 1989, Japanese automobile transplants increased their share of the U S domestic market from 0.5 percent to 6.8 percent. Comparing this 6 3 percent increase in the market share of Japan's transplants with the roughly 1 5 percent to 2 percent decline in the

market share of imports from Japan over the same period suggests a rough displacement rate of Japanese imports by transplant production in the U S market of 30 percent.[8] That is, for each 100 cars produced in Japanese-owned factories in the United States, 30 fewer cars will be imported from Japan. Even this relatively low displacement rate may be an overestimate because part of the recent import decline results from the falling value of the dollar over this period.[9]

As to export prospects, by 1993 Japanese transplants are expected to meet their announced plans to export cars both back to Japan and to other destinations. Actual exports from Japanese transplants in 1989 totaled about 18,000, the majority going to Japan but a significant number going to Taiwan By 1993, exports from Japanese auto transplants are expected to increase to about 150,000.

Combining these major components of Japanese auto transplant operations allows a rough calculation of the short- and longer term bilateral trade balance effects of Japanese direct investment in the U.S automobile industry (Table 4). If we assume that Japanese auto plants are producing at their announced capacity levels in 1993, production of passenger cars will increase from 680,642 in 1989 to 1.6 million in 1993 If prices of the cars produced in Japanese transplants increase from their 1989 level of $11,500 at 6 percent annually, the 1985-89 average annual increase in new car prices, their price will rise to $14,560 in 1993, and the current dollar value of this production will increase from $7.8 billion in 1989 to $23.3 billion in 1993. Auto exports are also expected to increase from their 1989 estimated value of $0 2 billion to $2.2 billion Domestic sourcing by Japanese auto transplants is expected to increase from the current rate of 50 percent to 75 percent by 1993 Imports of capital equipment by Japanese transplants from Japan are assumed to be negligible in 1993.

Chart 3

New Car Sales in the United States

Millions of units

Sources Ward's Automotive Reports and Automotive Yearbook

*1991 figure is the annualized total for the first quarter

[8]This rate is similar to a Nomura Research Institute estimate that roughly 25 percent of the difference between the forecasted and actual 1990 import market share was attributable to the presence of transplants (Nomura Research Institute, Quarterly Review, May 1990)

[9]Industry analyses suggest that over the next few years the impact of Japanese automobile investment on the trade balance may become smaller By 1993 transplants will have been producing for the compact car segment of the U S automobile market for a decade Imports from Japan, which in 1983 were virtually all in the compact car segment (including mini-subcompacts and subcompacts) will increasingly be classified in the midsize and luxury car segments of the market Several of these models are priced in the $25,000 to 30,000 range, more than double the current average price of about $11,500 for the most popular transplant models Although about 87 percent of Japanese imports are still classified as compacts, this compositional shift has reduced the substitutability of imports with transplants and increased the average price and hence the nominal value of future imports relative to current imports
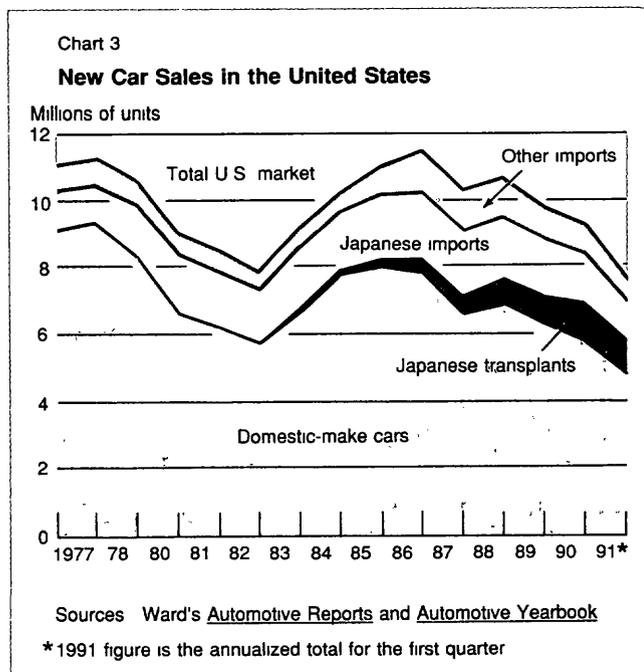
Table 4 brings together the current and projected transplant operations data to produce an estimate of the initial and longer run trade balance effects In 1989, higher imports of capital equipment and parts for transplant operations worsen the U S -Japanese bilateral trade balance by $2.6 billion, offsetting the $2 5 billion improvement in the trade balance resulting from the reduction in auto imports. By 1993, the trade balance effects associated with the $23 3 billion automobile production in Japanese transplants turn positive Since the longer run effects result primarily from the displacement of imports from Japan, the magnitude of these effects depends critically on the extent to which transplant output is assumed to replace imports Maintaining the assumption of a relatively low import displacement rate of 30 percent results in an estimated trade balance improvement of $5 4 billion. Auto exports rise by $2 2 billion, auto imports fall by $7 0 billion, and imports of parts and components equal $3 8 billion Alternatively, if the extreme assumption of a 100 percent displace-

ment rate is made, a much larger positive effect, an improvement in the trade balance of $21.7 billion, is realized Of course, a 100 percent displacement of imports is highly unlikely

In sum, the presence of Japanese transplants in the United States will reduce the U.S -Japan trade deficit over the medium term as Japanese automobile companies increasingly serve the U S market through their U.S. affiliates. Nevertheless, the size of the improvement is likely to be only about $5 billion if the import displacement rate remains at its estimated 1989 level.

Steel
FDI in the U S steel industry during the 1980s accompanied the downsizing and modernizing of that sector. Between 1980 and 1989, the value of assets in the U.S. steel industry fell by one-third, and the work force was cut in half FDI during this period became an important feature of the restructuring of the U S. steel industry and, in fact, helped maintain the viability of several U S

Table 4

Estimated Trade Balance Impact of Japanese Auto Transplants
(Billions of Dollars)

| | Initial Effects (Billions of Dollars) | |
	1989 (Actual)	1993 (Projected)
Capital equipment imports†	−0 5	0 0
Parts/components imports‡	−2 1	−3 8
Total	−2 6	−3 8

| | Longer Run Effects (Billions of Dollars) | | |
	1989 (Actual)	1993 (Projected)	
Assumed import displacement rate	30	30	100
Imports displaced	2 3	7 0	23 3
Exports	0 2	2 2	2 2
Total	2 5	9 2	25 5
Total trade balance effects	−0 1	5 4	21 7

Memo Assumptions underlying Table 4 calculations

	1989 (Actual)	1993 (Projected)
1 Auto production number of cars	680,642	1,600,000
2 Auto exports number of cars§	18,000	150,000
3 Auto prices average price of Japanese transplants sold domestically and exported‖	$11,500	$14,560
4 Yen/dollar exchange rate	138	138

†Value of capital equipment based on estimated total capital investment of $5 billion during the 1980s
‡Value of imported parts/components based on estimated share of parts/components supplied locally
§Taken from announced export plans
‖Prices of cars produced in transplants in 1989 were computed as a weighted average of the price of the most popular 1989 models of the four Japanese transplants Honda Civic and Accord, Nissan Sentra, Mazda MX6, and Toyota Corolla Shares of total production were used as weights Prices of 1993 models were estimated by inflating the 1989 prices by 6 2 percent annually, the average annual inflation rate in domestically built cars between 1985 and 1989

steel producers

Significant increases in investment in the U S steel industry came from Japan and Canada, particularly in the early and mid-1980s These investments largely took the form of joint ventures with U S steel producers rather than the building of new steelmaking capacity Much of Japan's investment in the U S steel industry was undertaken to supply inputs to Japanese auto transplants By 1989 all major U S steel producers except Bethlehem Steel had formed joint ventures with Japanese steel producers Total FDI in the U S steel industry during the 1980s increased the foreign-owned share of U S steel assets from 13 percent in 1980 to more than 34 percent in 1988 [10]

Imports of steel were restrained throughout most of the 1980s, particularly following the negotiation of Voluntary Export Restraints in 1984. These restraints limited the import market share in volume terms of several important steel industry products to roughly 20 percent [11] Interestingly, European Community steel firms, although facing binding restrictions on their exports, did not establish or acquire significant new steel production capacity in the United States during the 1980s By contrast, acquisitions by Japanese steel firms in recent years have made Japan the largest single foreign investor in the U S steel industry, with assets valued over $5 billion. This investment in the U S. steel industry was undertaken at the same time that Japan was filling only about 75 percent of its allowable steel import limit

Data are not available to analyze the impact of FDI in the steel industry thoroughly In particular, no information is available concerning the extent of domestic and foreign sourcing of components or the value of imports of capital equipment. However, the bulk of FDI in steel came in the early and mid-1980s, suggesting that the longer term effects of FDI on import displacement and increased export sales are the relevant considerations for this study

Affiliate operating data, available only for the primary metals market and with a relatively long time lag, show that since 1984 the transplant share of total production has fluctuated between 15 and 17 percent, while the transplant share of new capital spending has been in the range of only 8 percent to 12 percent (Chart 4) These data suggest that the transplants have not been major catalysts in the upgrading of investment and

hence have not yet been a source of significantly improved export prospects for the industry.

Significant reductions in steel imports did not coincide with the growth of foreign investment in the U.S steel industry during the 1980s. Import restraints were already limiting the ability of foreign firms to penetrate the U S market, keeping the overall share of nominal steel imports in the U S market at roughly 16 percent Data describing the foreign share of the U.S. domestic primary metals market show that import market shares did not significantly decline as affiliate market share grew in the early 1980s Since the mid-1980s, the mar-

[10]Major foreign equity investments in the U S steel industry during the 1980s are listed in United States International Trade Commission, "Annual Survey Concerning Competitive Conditions in the Steel Industry and Industry Efforts to Modernize and Adjust," Publication no 2226, October 1989
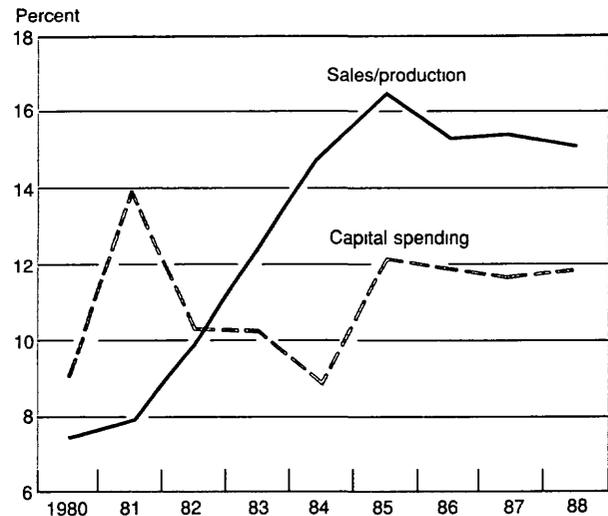
[11]The industry had been receiving protection from import competition in various forms since the 1960s

Chart 4

Foreign Share of the U.S. Primary Metals Industry

Shares of Sales and Capital Spending by Foreign-owned Firms

Percent

Notes Sales are total sales of foreign-owned firms as share of total domestic production, capital spending is share of total spending for new plant and equipment in the industry

Foreign Share of Domestic Primary Metals Sales

	1980	1985	1988	1989	1990
Imports	13 0	16 2	16 1	16 2	15 1
Affiliate sales	6 5	13 4	12 7	n a	n a
Foreign share	19 5	29 6	28 8	n a	n a

Note Foreign share is the percent of total domestic sales accounted for by imports and affiliates

Source U S Department of Commerce.

ket shares of imports and affiliates have both been relatively stable.

The impact of FDI from Japan, however, may be an exception to this general conclusion. A comparison of data for 1980 and 1988 reveals that a declining share of Japanese imports in the U.S. primary metals market has been associated with a higher market share for Japanese affiliates. A simple calculation can provide a rough estimate of the effect of Japanese acquisitions of U.S. steelmaking capacity on the U.S.-Japan trade balance in steel. Suppose that Japan's import market share had risen to fill its quota level by 1988, achieving a growth rate slightly less than that for imports of all Japanese manufactured goods. On this assumption, imports from Japan would have taken a larger share of the U.S. market, and the affiliate share would have been correspondingly lower. This higher import market share would have boosted imports of primary metals from Japan roughly $1 billion in 1988.

How the presence of foreign-owned firms will affect long-run prospects for continued improvement in the trade balance in the U.S. steel industry depends on the ability of the U.S. affiliates to expand their exports and further displace imports. Data on the share of U.S. primary metals affiliates in primary metals industry domestic sales and capital investment suggest that the affiliates will maintain their current share of industry exports but will probably not expand exports substantially. Long-run trade balance improvement in the U.S. steel industry, therefore, will result primarily from further displacement of imports by sales from U.S. affiliates.

The data presented on the trends in affiliate sales and import penetration of the U.S. primary metals market do not indicate that FDI is likely to be associated with significant import reduction. Nevertheless, that Japanese-owned steel plants are major suppliers of inputs to Japanese-owned auto transplants suggests some potential for future import reduction in steel. A rough estimate of the value of this future steel import reduction due to FDI can be derived from an estimate of the future growth in sales of primary metals affiliates in the U.S. market. In 1988, U.S. primary metals affiliate sales totaled $21 billion, having grown at an annual rate of roughly 4 percent since 1984. Continued annual sales growth at this rate through 1993 would raise total affiliate sales $5 billion to a new level of $26 billion. Affiliates of Japanese parents currently account for about one-fourth of sales of primary metals in the U.S. market. If their future share of all affiliate sales remained roughly the same, these Japanese affiliates would account for about $1 billion of additional sales. And if these affiliate sales fully displaced U.S. imports of primary metals, the steel industry trade balance would improve by the same magnitude.

Electronic equipment

The U.S. electronic equipment industry has had a relatively long experience with FDI. One segment of the industry, color televisions, which received protection from Japanese (and later Taiwanese and South Korean) imports from 1977 to the early 1980s in the form of negotiated Orderly Marketing Agreements, saw the start-up of seven Japanese-owned plants during the 1970s. In fact, by 1980 about 10 percent of all U.S. electronics industry assets were foreign owned, and by 1988 FDI increased this share to 13 percent.

Operating data on U.S. electronic equipment affiliates suggest that the growth in sales of these affiliates has not led to significant increases in electronic equipment exports. While foreign-owned firms accounted for roughly 11 percent of domestic sales in the industry in 1988, the foreign-owned share of exports was somewhat less (Chart 5).[12] Operations data also show that the affiliates have not been a particularly strong source of new capital spending in the industry. Despite the affiliates' competitiveness in the domestic market over the 1980s, their effect on industry performance and export expansion has not been substantial to date.

The electronics industry is the only one of the four industries under analysis in which imports, both in nominal terms and as a share of the domestic U.S. market, have grown rapidly throughout the entire 1980s. The import share of the domestic U.S. market for electronics grew at about the same rate as the import share of the U.S. manufacturing sector as a whole. Although the U.S. domestic market for electronic equipment doubled between 1980 and 1988, imports more than tripled over the same period. Moreover, sales of the U.S. affiliates of foreign firms grew almost two and a half times.

The performance of Japanese affiliates in the U.S. market illustrates the limited impact of FDI on electronic equipment imports. The share of the U.S. electronic equipment market held by U.S. affiliates of Japanese firms increased from 3.8 percent in 1980 to 7.5 percent in 1988. Over the same period, the market share of imports of electronic equipment from Japan doubled, growing at roughly the same rate as Japan's import market share in all manufactured goods. Consequently, the growth of sales from U.S. electronic equipment affiliates of Japanese firms appears to have had little impact on the growth of imports of electronic equipment from Japan.

Long-run prospects for trade balance improvement in the U.S. electronic equipment industry as a result of FDI appear limited. In 1988, exports from electronic equipment affiliates were roughly $2.5 billion, only

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[12]It should be noted that the export share of electronic equipment affiliates did increase relative to the affiliate share of industry sales in 1988.

slightly above the $2.0 billion recorded in 1984. Projecting this rate of growth through 1993 suggests an export expansion of less than $1 0 billion. The affiliate operating data on capital investment provide little basis for more optimistic assessments of export growth in the electronic equipment industry

The growth in imports of electronic equipment shows no signs of abating over the next several years A significant share of the foreign-owned elctronics facilities are assembly operations that have relatively low local content. Imports of foreign-produced parts and supplies, therefore, increase in proportion to domestic production. Productivity advances and competitive cost

structures abroad may further contribute to import expansion by enabling developing economies to expand their exports into a variety of electronics product lines. Moreover, outsourcing by U S electronics producers to Asian and Latin American countries will also lead to continued import expansion The presence of foreign-owned electronic equipment firms in the U S. market, therefore, appears unlikely to reverse the strong growth in imports of electronic equipment observed in the 1980s.

Chemicals
The U S. chemicals industry has had a longer and more extensive experience with foreign ownership than most U S. manufacturing industries. In 1980 over 16 percent of the assets of the industry were foreign-controlled This total increased to almost 30 percent in 1981, following the acquisition of about 20 percent of the assets of DuPont by Canadian investors [13] Unlike the other industries in this analysis, the chemicals industry has always been a strong exporter, has generated a trade surplus, and has not faced significant trade restrictions The major foreign investors in the U S. chemicals industry include Canada, the United Kingdom, and West Germany, and virtually all FDI has taken the form of acquisitions of existing U S firms.

Data on the shares of U S. affiliates of foreign chemicals firms in industry sales, capital spending, and exports suggest that the foreign presence may be increasingly significant in the long-run trade performance of the industry (Chart 6). The affiliate share of U.S. chemicals industry sales was relatively stable throughout the 1980s However, both the affiliates' share of U.S chemicals industry exports and their share of capital spending in the U S. chemicals industry have been increasing relative to their share of sales This finding suggests that the U S affiliates of foreign chemicals firms have become increasingly important in the overall trade competitiveness of the U S chemicals industry The increase in the affiliate share of exports relative to their share of sales also suggests that U S. chemicals affiliates are more oriented toward exporting their products than are domestic U S chemicals firms.

The relatively strong export orientation of chemicals affiliates is reflected in their relatively weaker performance in the U.S. market. The total foreign share of domestic U.S chemicals sales, defined as the sum of import and affiliate shares, grew by only 3.4 percent between 1981 and 1988 This growth was due almost

Chart 5

Foreign Share of the U.S. Electronics Industry

Shares of Sales, Capital Spending, and Exports by Foreign-owned Firms
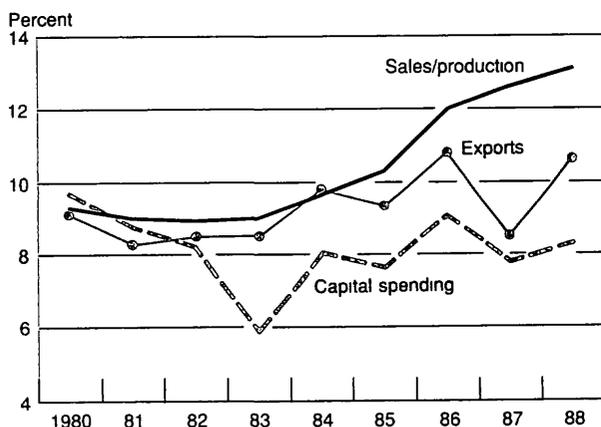
Notes Sales are total sales of foreign-owned firms as share of total domestic production, capital spending is share of total spending for new plant and equipment in the industry, exports are shares of industry totals

Foreign Share of Domestic Electronics Sales

	1980	1985	1988	1989	1990
Imports	12 1	17 7	20 7	21 3	25 8
Affiliate sales	8 2	8 6	10 6	n a	n a
Foreign share	20 3	26 3	31 3	n a	n a

Note Foreign share is the percent of total domestic sales accounted for by imports and affiliates

Source U S Department of Commerce

[13]The motives behind this acquisition seem to differ from those driving most foreign investment The Canadian investors owned shares of Conoco, an oil company, and became owners of DuPont when the two companies merged The influence of DuPont cannot be analyzed separately from that of other chemicals affiliates

entirely to an increase in import market share. Consequently, FDI in the U.S. chemicals industry, in contrast to FDI in the auto and steel industries, appears not to have had a significant displacement effect on U.S. chemicals imports.

In the long run, a continued expansion of exports by U.S. chemicals industry affiliates should improve the U.S. chemicals industry trade balance. After increasing at an annual rate of 11 percent since 1984, affiliate exports reached $8.5 billion in 1988. Projecting this rate of increase through 1993 suggests that the exports of chemicals industry affiliates would rise an additional $8 billion to more than $16 billion. Only part of this estimated increase, however, represents an increase in exports beyond what would have been expected on the basis of the current share of affiliates in chemicals

industry exports. Nevertheless, some fraction of this increase, perhaps $4 billion to $5 billion, can be attributed to the growing importance of chemicals industry affiliates in U.S. exports of chemicals.

Summary of estimated trade balance effects

The standard trade model analysis of the rapid buildup of FDI in the latter half of the 1980s suggests an aggregate long-run trade balance improvement on the order of $20 billion. This improvement is projected to result entirely from an expansion of exports. The statistical analysis indicates that the FDI buildup will have no impact on aggregate import levels.

However, several problems, most notably import restrictions, complicate the aggregate analysis. An analysis of FDI in four individual industries provides a more detailed understanding of the process by which FDI affects trade. Summing the trade balance effects estimated from the experiences of these four industries suggests a somewhat larger trade balance improvement.

The increase in exports predicted by the analysis of individual industries is somewhat smaller than that predicted by the aggregate statistical analysis. Exports in these four industries are estimated to expand by about $6 billion and are about equally divided between autos and chemicals. Since FDI in these four industries makes up about one-half of all FDI in manufacturing, a straightforward extrapolation of these industry estimates to all U.S. industries implies an expansion of U.S. exports of $12 billion, or twice the estimated industry effect. This estimated expansion of exports is about 60 percent of the increase in exports estimated in the aggregate analysis. Since neither method of estimating the export effect is without problems, a reasonable order of magnitude estimate of the long-run effect of

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Chart 6

Foreign Share of the U.S. Chemicals Industry

Shares of Sales, Capital Spending, and Exports by Foreign-owned Firms
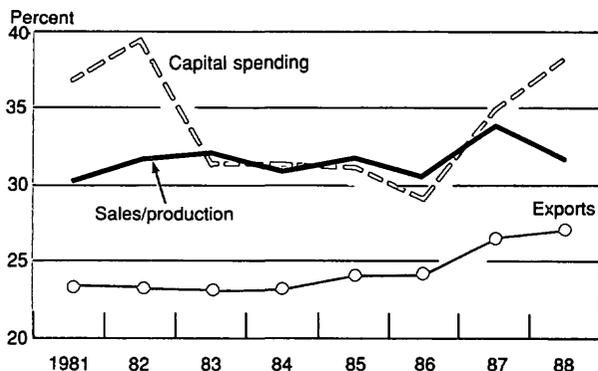
Notes: Sales are total sales of foreign-owned firms as share of total domestic production; capital spending is share of total spending for new plant and equipment in the industry; exports are shares of industry totals.

Foreign Share of Domestic Chemicals Sales

	1981	1985	1988	1989	1990
Imports	4.7	6.5	8.2	8.6	8.0
Affiliate sales	29.8	30.4	29.7	n.a.	n.a.
Foreign share	34.5	36.9	37.9	n.a.	n.a.

Note: Foreign share is the percent of total domestic sales accounted for by imports and affiliates.

Source: U.S. Department of Commerce.

Table 5

Long-Run Trade Balance Effects of Foreign Direct Investment

	(Billions of Dollars)
A. Increase in exports (model results and industry extrapolation)	15
B. Decrease in imports (industry extrapolation)	10
C. Net trade balance effects (A + B)	25

Notes: The estimated increase in exports is an average of the results of the aggregate statistical analysis and the industry effects. The estimated decrease in imports is extrapolated from industry effects.

FDI on exports would seem to be $15 billion, the rough average of the estimated aggregate and industry level effects.

In contrast to the aggregate statistical analysis that showed imports to be unaffected by FDI, analysis of the four industries suggested that imports would be reduced in the long run by roughly $5 billion. The aggregate analysis finding that FDI had no significant effect on imports reflects, in part, limitations on the usefulness of the standard trade model in this context. In particular, imports in several industries that have been important for FDI have been restrained during the 1980s by quotas. These import restraints have been relatively significant factors in trade in automobiles and steel, the two industries in which the industry-level studies pointed to potential import reductions due to FDI. Therefore, an estimate of the aggregate effect of FDI on imports is based entirely on the industry-level effects. Because FDI in these four industries was roughly one-half of all FDI in manufacturing, a straight-forward extrapolation of these industry effects suggests that imports would be lower in the long run by roughly $10 billion, or twice the estimated industry impact.

Combining the estimated expansion of exports of $15 billion attributable to FDI with the estimated reduction in import levels of $10 billion yields a net long-run trade balance improvement of $25 billion (Table 5). That is, as a result of the FDI that occurred in the latter half of the 1980s, the long-run trade balance is estimated to be improved by $25 billion relative to what it otherwise would have been. This estimated net trade balance effect would have represented a substantial improvement in the 1990 merchandise trade deficit of roughly $100 billion. The full effects of FDI on trade flows, however, are of a long-run nature and will not be completely realized for several years.

The estimated aggregate trade balance reduction attributable to FDI cannot be distributed regionally to produce estimates of the bilateral trade balance effects arising from FDI. Nevertheless, the evidence presented here does cast doubt on suggestions by some analysts that FDI will halve the current U.S.-Japan bilateral deficit. In those industries likely to be sources of trade deficit reductions with Japan, automobiles and steel, a smaller overall trade balance reduction appears much more likely. Significant bilateral effects attributable to FDI from other source countries, particularly the United Kingdom, are also likely to be small, because these investments are not clearly associated with the penetration of the U.S. market by U.K. imports.

The estimates of the potential trade balance effects of FDI in the U.S. manufacturing sector reported in this article are based on a study of the foreign investment that occurred in the latter half of the 1980s. To the extent that FDI in U.S. manufacturing industries is an ongoing process, however, foreign ownership of U.S. manufacturing firms will continue to expand into the 1990s. Although the relatively rapid rate of growth of FDI in the second half of the 1980s may not be repeated, additional FDI can be expected to result in further long-run improvements in the U.S. trade balance.

Conclusion

The positive trade balance effects of increased FDI in the U.S. manufacturing sector during the 1980s, particularly after 1985, will occur over the longer term and will be linked to competitiveness gains in foreign-owned firms. Because most foreign investors have entered the U.S. market by acquiring existing firms rather than transplanting production facilities, greater operating efficiency is likely to be the source of improved performance. Past experience with FDI, although limited, suggests that recent FDI inflows could lead to an improvement of roughly $25 billion in the U.S. trade balance.

This $25 billion net trade balance improvement should be interpreted as an order of magnitude estimate of the potential longer run effect of recent FDI inflows. The estimate is very uncertain because the U.S. manufacturing sector has had limited past experience with the sharp increases in FDI that occurred in the latter half of the 1980s. Furthermore, the longer run trade balance effect estimated from the aggregate statistical analysis differs somewhat from the estimate based on studies of individual manufacturing industries. Over time, these constraints on the analysis of the effects of FDI should be reduced, and the experiences of the manufacturing sector should provide an improved basis for estimating the effect of foreign investment on the trade balance.